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PART IIa SUBJECT INDEX NUMBER

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SUBJECT INDEX—PART II

INTRODUCTION

The entries in this index refer to the abstracts by their serial number, not by the page number. The entries are grouped under headings (printed in bold type, e.g. "**Algebra**"). If a heading for a particular subject does not appear, the subject may be in the form of a cross-reference to another heading, perhaps of a more general nature. Many of the headings are subdivided by the use of subheadings, which are indented (i.e. printed slightly to the right) and commence with a small letter.

The information contained in the subject index is illustrated by following example:

main heading
Crystal electron states 'See also' crossreference to another heading
See also Colour centres
keyword
(file word)
helicon relaxation of electron spins 1-17901
polarons
subheading modifier line (entry) abstract number in 1971

Associated with the subheading "polarons" is a 'See' crossreference as follows:

Polarons *See Crystal electron states/polarons*

This means that for papers on "polarons" the reader should consult the subheading "polarons" of "Crystal electron states" as displayed above.

ARRANGEMENT OF HEADINGS AND SUBHEADINGS

The headings and crossreferences are arranged throughout the index in alphabetical order according to the "word by word" system. The subheadings are themselves arranged in alphabetical order under their respective headings.

ARRANGEMENT OF ENTRIES UNDER HEADINGS

Entries are arranged in four distinct groups as follows:

First group:	arabic numerals
Second group:	English alphabet (A-Z), roman numerals, Greek alphabet (excluding elementary particles)
Third group:	elementary particle symbols, i.e. Greek and English alphabet, e.g. μ (muon), p (proton)
Fourth group:	chemical formulae (including entries beginning with nuclei, e.g. ^{57}Fe)

CLASSIFIED LIST OF SUBJECT INDEX HEADINGS

In this list the headings are not arranged in alphabetical order, but are grouped into sections by subject, on the same basis as the arrangement in the fortnightly issues of Physics Abstracts. By using this list the reader can quickly determine all the headings which are appropriate to his subject, and then they can easily be found in the main index in their alphabetical position.

HEADINGS WITH NO ENTRIES

All the headings in current use in a given year are printed, even those for which there are no abstracts to be recorded. The latter are followed by the announcement "No entries". This confirms that these headings have not been dropped from the index, and entries may appear under them in subsequent issues.

NUCLEI, ELEMENTS, COMPOUNDS AND OTHER SUBSTANCES

Abstracts on nuclei whose mass number (or mass number range) is given are listed under a set of headings which begin "**Nuclei with. . . .**" e.g. Nuclei with $6 \leqslant A \leqslant 19$ where A is the mass number.

The names of elements, their compounds, a few compounds of special interest (e.g. "**Ruby**", "**Water**") and a few common materials (e.g. "**Wood**", "**Paper**") are included as headings or subheadings (e.g. "**barium titanate**" under "**Barium compounds**"). Under these, as well as under the appropriate "subject" headings, are listed any abstracts which contain significant physical information about the element, compound or substance named.

Inorganic compounds of the elements are listed under the first element in the chemical formula, and all the compounds of a given element are grouped under a single heading (e.g. "**Sodium compounds**"). Alloys are listed under compounds of the named constituents, e.g. Au-Ag alloys under "**Gold compounds**" and "**Silver compounds**". There are also four special headings for the common alloys: "**Aluminium alloys**", "**Copper alloys**", "**Iron alloys**", "**Nickel alloys**". Organic compounds are grouped under "**Organic compounds**", "**Polymers**", "**Plastics**" and under special substance headings such as "**Paper**", "**Proteins**", etc.; all the latter are listed at the end of the classified list of headings. Metallic co-ordination compounds when regarded as inorganic are listed under the appropriate metallic compound heading (not under organic compounds), e.g. Ni complex, bis(dimethylglyoximato)nickel(II) under "**Nickel compounds**"

CLASSIFIED LIST OF SUBJECT INDEX HEADINGS

The headings are grouped into sections on the same basis as the arrangement of the abstracts in the fortnightly issues of Physics Abstracts. A summary of the layout of these sections (these are actually further subdivided), is given below. Each section lists the headings which concern its subject and it follows that many of the headings are listed in several places.

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  - scintillation
  - semiconductor
  - spark
  - statistical analysis
- Counting circuits
- Dosimetry
- Gamma-ray spectrometers
- Ionisation chambers
- Neutron spectrometers
- Nuclear bombardment targets
- Particle accelerators
- Particle detectors
- Particle optics
- Particle spectrometers
- Particle velocity analysis
- Photomultipliers
- Radioactivity measurement/
  - apparatus

11.15 Track Visualisation

- Bubble chambers
- Cloud chambers
- Energy loss of particles
- Luminescence chambers
- Nuclear track emulsions
- Particle tracks
- Particle track visualisation
- Spark chambers

11.20 PARTICLE ACCELERATORS

- High-voltage techniques
- Ion sources
- Particle accelerators/
  - accessories
  - betatrons
  - cyclotrons
  - linear
  - synchrotrons
- Storage rings

12.00 NUCLEAR PHYSICS

Nuclear physics

12.10 NUCLEAR STRUCTURE AND ENERGY LEVELS

- BCS theory
- Beta-ray spectra/
  - conversion electrons
- Gamma-ray spectra
- Gamma-rays/
  - angular distribution
  - internal conversion
- Gyromagnetic ratio
- Hypernuclei
- Isobaric analog states
- Mössbauer effect
- Nuclear excitation
- Nuclear forces
- Nuclear isomerism
- Nuclear magnetic resonance and relaxation
- Nuclear polarisation
- Nuclear structure
- Nuclei with A ≤ 5
- Nuclei with 6 ≤ A ≤ 19
- Nuclei with 20 ≤ A ≤ 49
- Nuclei with 50 ≤ A ≤ 89
- Nuclei with 90 ≤ A ≤ 149
- Nuclei with 150 ≤ A
- Nucleus/
  - electric moment
  - energy level transitions
  - energy levels
  - magnetic moment
  - models
  - size
  - spin and parity
  - theory

12.20 NUCLEAR DECAY AND RADIOACTIVITY

- Alpha-particles
- Alpha-particle spectra
- Alpha-particle spectrometers
- Alpha-particles/
  - absorption
  - angular distribution
  - detection, measurement
  - effects
  - scattering
- Beta-decay theory
- Beta-ray spectra/
  - conversion electrons
- Beta-ray spectrometers
- Beta-rays/
  - absorption
  - angular distribution
  - detection, measurement
  - effects
  - polarisation
  - scattering
- Biological effects of radiations
- Chemical effects of radiations/
  - ionising radiations
- Dosimetry
- Fallout
- Gamma-ray spectra
- Gamma-ray spectrometers
- Gamma-rays/
  - absorption
  - angular distribution
  - detection, measurement
  - effects
  - internal conversion
  - scattering
- Nuclear decay theory
- Nuclear bombardment targets
- Physical effects of radiations
- Radiation monitoring
- Radiation protection
- Radioactive dating
- Radioactive tracers
- Radioactivity/
  - decay periods
  - decay schemes
  - electron capture
- Radioactivity measurement/
  - apparatus
- Radiochemistry

12.30 NUCLEAR REACTIONS AND SCATTERING

- Chemical analysis/
  - by nuclear reactions
- Collision processes
- Nuclear bombardment targets
- Nuclear excitation
- Nuclear forces
- Nuclear reactions and scattering/
  - chemical effects
  - high energy ≥ 1GeV
- Nuclear reactions and scattering due to/
  - alpha-particles
  - cosmic rays
  - deuterons
  - electrons
  - helium-3
  - hyperons
  - mesons
  - muons
  - neutrinos
  - neutrons
  - nuclei of Z > 2
  - nucleons
  - photons
  - protons
  - tritons
- Nuclear spallation
- Nuclei with A ≤ 5
- Nuclei with 6 ≤ A ≤ 19
- Nuclei with 20 ≤ A ≤ 49
- Nuclei with 50 ≤ A ≤ 89
- Nuclei with 90 ≤ A ≤ 149
- Nuclei with 150 ≤ A
- Radiation monitoring
- Radiation protection
- Scattering, particles
- Stripping reactions

12.39 Nuclear fission and fusion

- Explosions/
  - nuclear
- Nuclear fission/
  - products
  - uranium
- Nuclear fusion
- Nucleons
- Photo fission
- Plasma
- Thermonuclear reactions

12.40 NUCLEAR POWER STUDIES

12.43 Neutron Physics

- Neutron transport theory
- Neutrons and antineutrons/
  - absorption
  - angular distribution
  - detection measurement
  - diffusion
  - effects
  - interactions
  - moderation
  - polarisation
  - production
  - reflection
  - scattering
- Nuclear fission/
  - products
  - uranium
- Nuclear fusion
- Nuclear reactions
- Thermonuclear reactions

12.47 Nuclear Reactors

- Biological effects of radiations
- Chemical analysis/
  - by nuclear reactions
- Chemical effects of radiations/
  - ionising radiations
- Dosimetry
- Nuclear fission/
  - products
  - uranium
- Nuclear fusion
- Nuclear reactions/
  - chemical effects
- Nuclear reactors, fission/
  - materials
  - operation
  - theory
- Nuclear reactors, fusion
- Physical effects of radiations
- Plasma/
  - devices
- Radiation monitoring
- Radiation protection
- Radiochemistry
- Thermonuclear reactions

12.50 RADIATION TECHNOLOGY

- Dosimetry
- Neutron transport theory
- Physical effects of radiation
- Radiation protection
- Nuclear reactors, fission/
  - operation
- Biological effects of radiation
- Particle accelerators/
  - betatrons
  - cyclotrons
  - linear
  - synchrotrons

13.00 ATOMIC AND MOLECULAR PHYSICS

Collision processes
Orbital calculation methods
Quantum theory

13.10 MASS SPECTROMETERS

Mass spectra

Mass spectrometers/
    accessories
    applications

13.20 ATOMS

Atomic beams
Atomic mass and weight
Atoms
    electron scattering
    excitation
    magnetic moment
    structure
Auger effect
Binding energy
Charge exchange
Collision processes/
    atoms

Electron emission
    photoelectric
Elements
    origin
    relative abundances
Exchange interactions
Gyromagnetic ratio
Hartree-Fock method
Helium/
    gas

Hydrogen/
    ions
    neutral atoms
Ionisation potential
Isotope shifts
Luminescence
    gases
Optical pumping
Orbital calculation methods
Periodic system
Polarisability
Rayleigh scattering

Red shift
Russell-Saunders coupling
Spectra
    atoms
Spectral line breadth
Stark effect
Stimulated emission
X-ray spectra
    absorption
    emission
Zeeman effect

13.25 Isotopes

Isotope effects
Isotope exchanges
Isotope separation
Isotopes
    detection
    relative abundances
Mass spectra

Mass spectrometers/
    applications
Radioactive dating
Radioactive tracers
Radiochemistry
Tracers

13.27 Mesic and Muonic Atoms

Atoms, mesic and muonic

13.30 MOLECULES

Binding energy
Bonds
Chemical shift
Chemical structure
Exchange interactions
Isomerism
Jahn-Teller effect
Luminescence/
    gases
LCAO calculations
Magnetic resonance and relaxation
Molecular weight

Molecules/
    configuration and dimensions
        inorganic
        organic
    excitation
    internal mechanics
    electronic structure
    electronic structure, inorganic
    electronic structure, organic
    nuclear coupling
    relaxation
    rotation
    vibration
    moments

Nuclear magnetic resonance and relaxation
Nuclear quadrupole resonance
Optical pumping
Orbital calculation methods
Paramagnetic resonance and relaxation
Polarisability
Rayleigh scattering
Red shift
Scattering/
    light
    light, Brillouin spectra
    light, Raman spectra
    light, Raman spectra, inorganic
    light, Raman spectra, organic

Spectra/
    inorganic molecules
        diatomic
        diatomic, radiofrequency
        polyatomic
        polyatomic, radio-frequency
    inorganic liquids and solutions
    inorganic solids
        radiofrequency
    molecules
    organic molecules and substances
        infrared
        radiofrequency
Spectral line breadth
Stark effect
Stimulated emission
Valency
Zeeman effect

13.35 Macromolecules

Association
Heat of formation
Isomerism
Macromolecules

Molecules/
    configuration and dimensions, macromolecules
Polymers
Proteins

13.36 Mesic and Muonic Molecules

Molecules, mesic and muonic

13.37 Intermolecular mechanics

Charge exchange
Collision processes/
    molecules

Molecular beams
Molecules/
    intermolecular mechanics

14.00 FLUIDS

Boundary layers
Flow/
    two-phase
Fluidised beds

Fluids
Hydrodynamics
Hydrostatics

Non-Newtonian fluids
Oscillations
Turbulence

Viscosity
Vortices
Waves

14.10 MAGNETOHYDRODYNAMICS

- Magnetohydrodynamics
- Shock waves/
  - effects
- Turbulence

14.20 PLASMA

- Discharges, electric/
  - glows
  - high-frequency
- Electrohydrodynamics
- Electrode density
- Nuclear fusion
- Nuclear reactors, fusion
- Plasma/
  - collison processes
  - electromagnetic waves
  - magnetohydrodynamics
  - production
  - shock waves
  - transport processes
- Shock waves/
  - effects
- Space charge/
  - gas
- Thermonuclear reactions

14.24 Plasma Confinement, Devices and Measurements

- Plasma/
  - confinement
  - devices
  - diagnostics
- Probes
- Stellarators

14.26 Plasma Oscillations and Stability

- Plasma/
  - magnetohydrodynamics
  - oscillations
  - stability

14.30 IONISATION

- Charge exchange
- Dissociation
- Ion velocity
- Ionisation/
  - gases
- Ionisation potential
- Ionisation, surface
- Ions/
  - recombination
  - scattering
- Magnetohydrodynamic waves
- Photoionisation/
  - gases
- Shock waves/
  - effects
- Space charge/
  - gas

14.40 ELECTRIC DISCHARGES

- Arcs, electric
- Breakdown, electric/
  - gases
- Corona, electric discharge
- Discharges, electric/
  - glows
  - high frequency
- Electron density
- Gas-discharge tubes
- Lightning
- Sparks, electric
- Sputtering

14.50 MECHANICS OF GASES

- Acoustic streaming
- Aerodynamics
- Anemometers
- Compressibility/
  - gases
- Condensation
- Density/
  - gases
- Diffusion in gases/
  - thermal
- Flow/
  - gases
  - two-phase
- Flowmeters
- Gases
- Humidity
- Hygrometers
- Jets
- Manometers
- Moisture
- Pressure
- Pumps
- Radiation pressure
- Supersonic flow
- Turbulence
- Viscometers
- Viscosity/
  - gases
- Vortices
- Waves

14.60 GASEOUS STATE

- Absorption/
  - acoustic waves
  - acoustic waves, ultrasonic
  - electromagnetic waves
  - light
- Acoustic wave amplification
- Association/
  - gases
- Breakdown, electric/
  - gases
- Conductivity, electrical/
  - gases
  - measurement
- Conductivity, thermal/
  - gases
  - measurement
- Dielectric properties of substances/
  - gases
- Diffraction/
  - acoustic waves
  - acoustic waves, ultrasonic
  - electromagnetic waves
  - light
- Diffusion/
  - acoustic waves
  - electromagnetic waves
  - light
- Electrical properties of substances
- Electroluminescence
- Equations of state/
  - gases
- Fluorescence
- Gases
- Helium/
  - gas
- Interference/
  - acoustic waves
- Joule-Thomson effect
- Kinetic theory/
  - gases
- Lasers/
  - gaseous
- Luminescence/
  - gases
- Magnetic resonance and relaxation
- Molecules/
  - intermolecular mechanics
- Nuclear magnetic resonance and relaxation
- Nuclear quadrupole resonance
- Optical properties of substances
- Paramagnetic resonance and relaxation
- Permittivity
- Phosphorescence
- Rayleigh scattering
- Reflection/
  - acoustic waves
  - acoustic waves, ultrasonic
  - electromagnetic waves
  - light
- Refraction/
  - acoustic waves
  - acoustic waves, ultrasonic
  - electromagnetic waves
  - light
- Scattering/
  - acoustic waves
  - acoustic waves, ultrasonic
  - electromagnetic waves
  - light
- Sorption
- Specific heat/
  - gases
- Spectra
- Statistical mechanics
- Thermoluminescence
- Transmission/
  - acoustic waves
  - acoustic waves, ultrasonic
  - light
- Velocity/
  - acoustic waves
  - acoustic waves, ultrasonic
- X-ray fluorescence

14.65 Viscosity and Diffusion of Gases

- Diffusion in gases/
  - thermal
- Transport processes
- Viscosity/
  - gases

14.70 MECHANICS OF LIQUIDS

- Acoustic streaming
- Bubbles
- Capillarity
- Cavitation
- Compressibility/
  - liquids
- Density/
  - liquids
- Diffusion in liquids
  - thermal
- Double refraction/
  - flow
- Drops
- Elasticity/
  - liquids
- Emulsions
- Films/
  - liquid
- Filters
- Flow/
  - liquids
  - two-phase
- Flowmeters
- Foams
- Hydrodynamics
- Hydrostatics
- Jets
- Liquid oscillations
- Liquid waves/
  - surface
- Lubrication
- Moisture
- Pressure
- Pumps
- Radiation pressure
- Rheology
- Schlieren systems
- Sprays
- Surface energy
- Surface tension
- Surface tension measurement
- Thixotropy
- Turbulence
- Viscometers
- Viscosity/
  - liquids
- Vortices
- Wetting

14.80 LIQUID STATE

- Liquids
- Liquid metals

14.82 Theory and Structure of Liquids and Solutions

- Association/
  - liquids
- Electron diffraction examination
  of materials
- Equations of state/
  - liquids
- Films/
  - liquid
- Heat of solution
- Liquid crystals
- Liquids/
  - structure
  - theory
- Neutron diffraction examination
  of materials
- Neutrons and antineutrons/
  - scattering
- Polymers
- Solubility
- Solutions
- X-ray examination of materials/
  - liquids

14.83 Viscosity, Surface tension and Diffusion

- Diffusion in liquids/
  - thermal
- Filters
- Membranes
- Osmosis
- Sorption
- Surface tension
- Surface tension measurement
- Transport processes
- Viscosity/
  - liquids

14.85 Thermal Properties of Liquids

- Conductivity, thermal/
  - liquids
  - measurement
- Heat of solution
- Specific heat/
  - liquids
- Thermal expansion
- Thermodynamic properties

14.86 Acoustical Properties of Liquids

- Absorption/
  - acoustic waves
  - acoustic waves, ultrasonic
- Acoustic wave amplification
- Acoustic wave propagation/
  - ultrasonic
- Diffraction/
  - acoustic waves
  - acoustic waves, ultrasonic
- Diffusion/
  - acoustic waves
- Interference/
  - acoustic waves
- Reflection/
  - acoustic waves
  - acoustic waves, ultrasonic
- Refraction/
  - acoustic waves
  - acoustic waves, ultrasonic
- Scattering/
  - acoustic waves
  - acoustic waves, ultrasonic
- Transmission/
  - acoustic waves
  - acoustic waves, ultrasonic
- Velocity/
  - acoustic waves
  - acoustic waves, ultrasonic

14.87 Optical Properties of Liquids

- Absorption/
  - electromagnetic waves
  - light
- Chemical shift
- Chemiluminescence
- Diffraction/
  - electromagnetic waves
  - light
- Diffusion/
  - electromagnetic waves
  - light
- Double refraction/
  - flow
- Electroluminescence
- Fluorescence
- Luminescence/
  - liquids and solutions
- Optical pumping
- Optical properties of substs.
- Phosphorescence
- Rayleigh scattering
- Reflection/
  - electromagnetic waves
  - light
- Refraction/
  - electromagnetic waves
  - light
- Scattering/
  - electromagnetic waves
  - light
  - light, Brillouin spectra
  - light, Raman spectra
  - light, Raman spectra, inorganic
  - light, Raman spectra, organic
- Spectra/
  - inorganic liquids and solutions
- Stimulated emission
- Thermoluminescence
- Transmission/
  - light
- X-ray fluorescence

14.88 Electrical and Magnetic Properties of Liquids

Absorption/
  electromagnetic waves
Acoustic paramagnetic resonance
Breakdown, electric/
  liquids
Conductivity, electrical/
  liquids
  liquids, electrolytic
  measurement
Dielectric properties of substs./
  liquids and solutions
Electrical properties of substs.
ENDOR
Ferroacoustic resonance
Ionisation, liquids
Liquid metals
Magnetic properties of substs.
Magnetic resonance and relaxation
Metals
Nuclear acoustic resonance
Nuclear magnetic resonance and relaxation
Nuclear quadrupole resonance
Paramagnetic resonance and relaxation
Permittivity
Proton magnetic resonance
Semiconducting materials
Semiconductors

14.90 DISPERSIONS AND COLLOIDS

Aerosols
Centrifuges
Colloids
Disperse systems
Electrophoresis
Emulsions
Filters
Foams
Gels
Heat of solution
Membranes
Osmosis
Particle size
Precipitation
Sedimentation
Sols
Solubility
Solutions
Surface phenomena
Suspensions
Thixotropy

14.95 Liquid and solid helium

Helium/
  liquid
  liquid, sound propagation
  solid
Quantum fluids/
  boson systems
  fermion systems
Second sound
Zero sound

15.00 CHANGE OF STATE

Boiling
Boiling point
Condensation
Critical constants, thermal
Distillation
Drying
Equations of state
  gases
  liquids
  solids
Evaporation
Freezing
Heat of fusion
Heat of sublimation
Heat of transformation
Heat of vaporisation
Humidity
Liquefaction, gases
Melting
Melting point
Phase equilibrium
Phase transformations
Sublimation
Supercooling
Vapour pressure
Vapour pressure measurement
Vaporisation

16.00 SOLID STATE STRUCTURE AND MECHANICAL PROPERTIES

Crystal properties
Equations of state/
  solids
Solids/
  structure
  theory

16.10 NON-CRYSTALLINE STATE

Amorphous state
Glass
Plastics
Polymers
Rubber
Vitreous state
Waxes

16.20 SURFACE AND INTERFACE PHENOMENA

Interface phenomena
Surface energy
Surface measurement
Surface phenomena
Surface structure

16.23 Films. Whiskers. Dendrites

Crystals/
  growth
Epitaxy
Evaporation
Films, solid/
  electrical properties
  magnetic properties
  optical properties
Sputtering
Sublimation

16.25 Adsorption

Adsorbed layers
Adsorption
Chemisorption
Composite materials
Desorption
Heat of adsorption
Sorption

16.30 CRYSTALLOGRAPHY

Binding energy
Bonds
Charge compensation
Cleavage
Crystal chemistry
Crystal properties
Crystallography
Crystals/
  etching
  faces
  orientation
  twinning
Debye-Waller factors
Field ion microscopy
Isomorphism
Lattice energy
Minerals
Polymorphism
Solids/
  structure
Surface structure

16.33 Crystal growth

Crystallisation
Crystals/
  growth
  whiskers
Decomposition
Dendrites
Epitaxy
Nucleation
Zone melting and refining

16.35 Crystal Structures, Techniques and Apparatus

- Alloys
- Amorphous state
- Crystal structure/
  - microstructure
- Crystal structure, atomic/
  - alloys
  - elements
  - inorganic compounds
  - organic compounds
- Debye-Waller factors
- Density/
  - solids
- Electron diffraction crystallography
- Electron diffraction examination of materials
- Electron microscope examination of materials
- Electron microscopy
- Fibres
- Field ion microscopy
- Grain boundaries
- Granular structure
- Ion microscopes
- Metallurgy
- Microscopy
- Neutron diffraction crystallography
- Neutron diffraction examination of materials
- Particle size
- Polymers
- Porous materials
- Powders
- Radiography
- Space groups
- Surface structure
- X-ray absorption
- X-ray crystallography/
  - apparatus
  - calculation apparatus
  - calculation methods
  - technique
- X-ray diffraction
- X-ray examination of materials
  - microstructure
  - molecular structure
- X-ray measurement
- X-ray monochromators
- X-ray reflection
- X-ray scattering
- X-ray tubes

16.40 DEFECT PROPERTIES OF SOLIDS

- Cold working
- Creep
- Crystal imperfections
  - dislocations
  - impurities
  - interstitials
  - vacancies
- Crystal structure
- Crystals
  - etching
  - twinning
- Deformation
- Elastic deformation
- Electron diffraction examination of materials
- Electron microscope examination of materials
- Grain boundaries
- Heat treatment
  - alloys
- Internal friction
- Neutron diffraction examination of materials
- Plastic deformation
- Plastic flow
- Slip
- Stacking fault
- Stresses, internal
- Work hardening
- X-ray examination of materials/
  - microstructure

16.43 Crystal Impurities

16.45 Colour centres

- Absorption/
  - light
- Colour centres
- X-rays/
  - effects

16.50 DIFFUSION IN SOLIDS

- Diffusion in solids/
  - thermal
- Permeability, mechanical

16.60 MECHANICAL PROPERTIES OF SOLIDS

- Abrasion
- Bending
- Brittleness
- Compressibility
- Cracks
- Creep
- Deformation
- Densification
- Density/
  - solids
- Elastic constants/
  - measurement
- Elastic deformation
- Elastic limit
- Elastic relaxation
- Elasticity/
  - fatigue
- Fracture
- Friction
- Hardness
- High-pressure phenomena and effects
- Hysteresis
- Impact
- Internal friction
- Lubrication
- Magnetoelastic waves
- Magnetomechanical effects
- Mechanical properties of substances
- Mechanical strength/
  - compressive
  - shear
  - tensile
- Photoelasticity
- Plastic deformation
- Plastic flow
- Plasticity
- Rheology
- Slip
- Strain gauges
- Stress analysis
- Stress effects
- Stress/strain relations
- Stresses, internal
- Thermoelasticity
- Thixotropy
- Torsion
- Viscoelasticity
- Wear

16.65 Metallurgy. Materials Science. Phase Transformations

- Adhesion
- Aging
- Alloys
- Annealing
- Cold working
- Corrosion
- Forming processes
- Heat treatment/
  - alloys
- Metallurgy
- Order-disorder changes
- Phase equilibrium
- Phase transformations/
  - solid-state
- Physical effects of radiations
- Polymorphism
- Powders
- Precipitation
- Refractories
- Sintering
- Solid solutions
- Solubility
- Work hardening

16.70 LATTICE MECHANICS

- Crystals/
  - lattice mechanics
- Debye temperature
- Debye-Waller factors
- Mössbauer effect
- Phonons

16.80 ACOUSTICAL PROPERTIES OF SOLIDS

- Absorption/
  - acoustic waves
  - acoustic waves, ultrasonic
- Acoustic wave amplification
- Acoustic wave propagation/
  - ultrasonic
- Acoustoelectric effects
- Acousto-optical effects
- Diffraction/
  - acoustic waves
  - acoustic waves, ultrasonic
- Dispersion, acoustic/
  - ultrasonic
- Magnetoacoustic effects
- Reflection/
  - acoustic waves
  - acoustic waves, ultrasonic
- Refraction/
  - acoustic waves
  - acoustic waves, ultrasonic
- Scattering/
  - acoustic waves
  - acoustic waves, ultrasonic
- Transducers
- Transmission/
  - acoustic waves
  - acoustic waves, ultrasonic
- Velocity/
  - acoustic waves
  - acoustic waves, ultrasonic

16.90 THERMAL PROPERTIES OF SOLIDS

- Conductivity thermal/
  - measurement
  - solids
- Debye temperature
- Equations of state/
  - solids
- Gruneisen relation
- Heat conduction
- Specific heat/
  - solids
- Thermal expansion
- Thermodynamic properties

16.95 RADIATION INTERACTION WITH SOLIDS

- Acoustic waves/
  - effects
- Alpha-particles/
  - effects
- Beta-rays/
  - effects
- Channelling
- Deuterons/
  - effects
- Electron beams/
  - effects
- Energy loss of particles
- Gamma-rays/
  - effects
- Hyperons/
  - effects
- Ion beams/
  - effects
- Mesons/
  - effects
- Neutrons and antineutrons/
  - effects
- Physical effects of radiations
- Protons and antiprotons/
  - effects
- Sputtering
- X-rays/
  - effects

17.00 SOLID STATE ELECTRICAL AND MAGNETIC PROPERTIES

- Crystals/
  - internal fields

17.10 ELECTRON STATES IN SOLIDS

- Brillouin zones
- Crystal electron states
  - band structure
  - excitons
  - Fermi level
  - Fermi surface
  - impurity states and effects
  - plasma
  - polarons
  - surface
  - transport processes
- Crystal properties
- Cyclotron resonance
- de Haas-van Alphen effect
- Electron beams/
  - effects
- Electron density
- Electron gas
- Electron pairs/
  - annihilation
- Electron-phonon interactions
- Electron traps
- Electrons
  - absorption
  - radiation
  - scattering
- Hall effect
- Helicons
- Kondo effect
- Magnetoacoustic effects
- Magnetoresistance
- Metals/
  - theory
- Piezoresistance
- Pseudopotential methods
- Quasi-particles
- Skin effect
- Solids/
  - theory
- Surface phenomena
- Tunnelling
- Zero sound

17.20 ELECTRICAL PROPERTIES OF SOLIDS

- Acoustoelectric effects
- Conductivity, electrical/
  - measurement
  - solids
- Contacts, electrical
- Crystal electron states
- Eddy-currents
- Electrical properties of substs.
- Electron density
- Electron gas
- Electro-optical effects
- Films, solid/
  - electrical properties
- Fluctuations
- Hall effect
- Magnetoelectric effects
- Magnetoresistance
- Magnetothermal effects
- Noise, electrical
- Piezoelectricity
- Piezoresistance
- Space charge
- Thin film devices
- Tunnelling

17.22 Metallic Conducting Properties

- Electron gas
- Hall effect
- Magnetoelectric effects
- Magnetoresistance
- Metals/
  - theory
- Piezoresistance
- Semimetals
- Skin effect
- Thin film devices

17.24 Superconducting Properties

- BSC theory
- Galvanothermomagnetic effects
- Storage devices
- Superconducting devices
- Superconducting magnets
- Superconducting materials/
  - lead
  - niobium
- Superconductivity/
  - type II
- Thin film devices
- Tunnelling

17.26 Semiconducting Properties

- Acoustoelectric effects
- Contacts, electrical
- Electron gas
- Electro-optical effects
- Fluctuations
- Gunn effect
- Hall effect
- Ion implantation
- Magnetoelectric effects
- Magnetoresistance
- Magnetothermal effects
- Noise, electrical
- Piezoelectricity
- Piezoresistance
- Semiconductors
- Space charge
- Semiconducting materials/
  - gallium arsenide
  - germanium
  - indium antimonide
  - silicon
- Tunnelling

17.28 Semiconductor and Interface devices

- Gunn effect
- Ion implantation
- Metal-insulator-metal structures and devices
- Metal-insulator-semiconductor structures and devices
- Microwave techniques and devices
- Rectifiers
- Semiconductor devices/
  - diodes
  - junctions
  - transistors
  - tunnel and interface devices
- Semiconductor-metal boundaries
- Storage devices
- Thin film devices
- Tunnelling

17.29 Dielectric Properties

- Antiferroelectric materials
- Breakdown, electric/
  - solids
- Contacts, electrical
- Dielectric devices
- Dielectric measurement
- Dielectric phenomena
- Dielectric properties of substs./
  - solids
- Dielectric relaxation
- Domains
- Electrets
- Electric charge
- Electric fields
- Electric strength
- Electrostriction
- Ferroelectric materials/
  - barium titanate
- Ferroelectric phenomena
- Hysteresis
- Ionic conduction, solids
- Paraelectric resonance
- Permittivity
- Piezo-optical effects
- Piezoelectric oscillations
- Piezoelectricity
- Pyroelectricity
- Relaxation
- Rochelle salt
- Space charge/
  - solid
- Triboelectricity
- Tunnelling

17.40 THERMOELECTROMAGNETIC PROPERTIES

- Magnetoelectric effects
- Magnetothermal effects
- Thermocouples
- Thermoelectricity

17.50 PHOTOELECTRIC PROPERTIES

- Photoconducting devices
- Photoconductivity
- Photoelectricity
- Photoelectromagnetic effects
- Photovoltaic effects

17.52 ELECTRON AND ION EMISSION BY SOLIDS

- Cathodes/
  - oxide
- Electron emission
  - field emission
  - photoelectric
  - secondary
  - thermionic
- Ion emission/
  - secondary
  - thermionic
- Ionisation/
  - solids
- Ionisation, surface
- Work function

17.60 MAGNETIC PROPERTIES OF SOLIDS

- Antiferromagnetism
- de Haas-van Alphen effect
- Diamagnetism
- Demagnetisation
- Domains
- Electron diffraction examination of materials
- Electron microscope examination of materials
- Exchange interactions
- Ferrimagnetism
- Ferrites
- Ferromagnetism/
  - spin-wave theory
- Films, solid/
  - magnetic properties
- Gyromagnetic ratio
- Hall effect
- Hysteresis
- Kondo effect
- Magnetic devices
- Magnetic fields/
  - effects
- Magnetic anisotropy
- Magnetic permeability
- Magnetic properties of dilute systems
- Magnetic properties of substs.
  - antiferromagnetic
  - diamagnetic
  - ferrimagnetic
  - ferromagnetic
  - paramagnetic
  - transitions
- Magnetism
- Magnetisation process
- Magnetoacoustic effects
- Magnetoelastic waves
- Magnetoelectric effects
- Magneto-optical effects
- Magnetoresistance
- Magnetostriction
- Magnetothermal effects
- Neutron diffraction examination of materials
- Paramagnetism
- Zeeman effect

17.62 Paramagnetic Properties

- Magnetic anisotropy
- Magnetic properties of substances/
  - paramagnetic
- Paramagnetism

17.64 Ferromagnetic Properties

- Domains
- Exchange interactions
- Ferromagnetism/
  - spin-wave theory
- Films, solid/
  - magnetic properties
- Heisenberg model
- Helicons
- Hysteresis
- Magnetic devices
- Ising lattices and models
- Magnetic anisotropy
- Magnetic properties of substances/
  - ferromagnetic
- Magnetisation process
- Metamagnetism
- Storage devices
- Superparamagnetism
- Spin waves
- Thin film devices

17.66 Ferrimagnetic Properties

- Domains
- Exchange interactions
- Ferrimagnetism
- Ferrites
- Films, solid/
  - magnetic properties
- Helicons
- Hysteresis
- Magnetic anisotropy
- Magnetic devices
- Magnetic properties of substances/
  - ferrimagnetic
- Thin film devices
- Spin waves
- Storage devices

17.68 Antiferromagnetic Properties

- Antiferromagnetism
- Domains
- Exchange interactions
- Heisenberg model
- Magnetic anisotropy
- Magnetic properties of substances/
  - antiferromagnetic
- Metamagnetism
- Spin waves

17.69 Magnetic Relaxation Phenomena

- Ferromagnetic relaxation
- Magnetic resonance and relaxation
- Nuclear magnetic resonance and relaxation
- Paramagnetic resonance and relaxation
- Spin lattice relaxation
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18.00 SOLID STATE SPECTROSCOPY AND OPTICAL PROPERTIES

- Chemical shift
- Crystal field theory
- Crystals/
  - hyperfine field interactions
- Jahn-Teller effect
- Nuclear polarisation

18.10 OPTICAL PROPERTIES OF SOLIDS

- Absorption/
  - electromagnetic waves
  - light
- Acousto-optical effects
- Diffraction/
  - electromagnetic waves
  - light
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  - electromagnetic waves
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- Dispersion, optical
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- Electro-optical effects
- Emissivity
- Faraday effect
- Films, solid/
  - optical properties
- Interference/
  - light
- Lasers/
  - solid
- Magneto-optical effects
- Nonlinear optics
- Optical constants
- Optical materials
- Optical properties of substances
- Optical pumping
- Optical rotation
- Photoelasticity
- Piezo-optical effects
- Pleochroism
- Polarisation/
  - light
- Reflection/
  - electromagnetic waves
  - light
- Reflectivity
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  - light
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  - light
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  - electromagnetic waves
  - light
- Transmission/
  - light
- Transparency
- Velocity/
  - light

18.20 RESONANT GAMMA RAY INTERACTIONS. MÖSSBAUER EFFECT

- Crystals/
  - hyperfine field interactions
  - internal fields
- Mössbauer effect

18.30 OPTICAL SPECTRA OF SOLIDS

- Crystals/
  - hyperfine field interactions
- Reflection/
  - electromagnetic waves
  - light
- Reflectivity
- Scattering/
  - electromagnetic waves
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  - organic molecules and substances, infrared
  - organic molecules and substances, radio frequency
- Spectral line breadth
- Stark effect
- Stimulated emission
- X-ray spectra/
  - absorption
  - emission
- Zeeman effect

18.40 LUMINESCENCE SPECTRA OF SOLIDS

- Chemiluminescence
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- Counters/
  - scintillation
- Electroluminescence
- Fluorescence
- Luminescence/
  - solids, inorganic
  - solids, organic
- Luminescent devices
- Phosphorescence
- Thermoluminescence
- X-ray fluorescence

18.50 MAGNETIC RESONANCES IN SOLIDS

- Crystals/
  - hyperfine field interactions
- Antiferromagnetic resonance
- Cyclotron resonance
- Ferrimagnetic resonance
- Ferroacoustic resonance
- Ferromagnetic relaxation
- Ferromagnetic resonance
- Gyromagnetic ratio
- Magnetic resonance and relaxation
- Magnetoelastic waves
- Magnetomechanical effects
- Optical pumping

18.52 Paramagnetic Resonances and Relaxation

- Acoustic paramagnetic resonance
- Crystals/
  - hyperfine field interactions
- Paramagnetic resonance and relaxation/
  - measurement

18.54 Nuclear Magnetic Resonance and Relaxation

- Crystals/
  - hyperfine field interactions
- ENDOR
- INDOR
- Knight shift
- Nuclear acoustic resonance
- Nuclear magnetic resonance and relaxation/
  - measurement
- Nuclear quadrupole resonance
- Proton magnetic resonance

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- Bonds
- Centrifuges
- Chemical structure
- Chemical technology
- Distillation
- Elements/
  - origin
  - relative abundances
- Filters
- Isomerism
- Laboratory app. and technique
- Macromolecules
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- Molecular weight determination
- Periodic system
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19.10 THERMOCHEMISTRY AND REACTIONS

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  - liquids
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- Heat of combination
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- Heat of formation
- Heat of reaction
- Isotope exchanges
- Phase equilibrium
- Phase transformations
- Polymerisation
- Polymers
- Reaction kinetics
- Sorption

19.15 Oxidation and Corrosion

- Corrosion
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19.20 ELECTROCHEMISTRY

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  - liquids, electrolytic
- Dissociation/
  - electrolytic
- Electric cells
- Electrochemistry
  - electrodes
- Electrokinetic effects
- Electrolysis
- Electrolytic deposition
- Electrophoresis
- Ion velocity/
  - electrolytic
- Ions, electrolytic

19.30 PHOTOCHEMISTRY AND RADIOCHEMISTRY

- Chemical effects of radiations/
  - acoustic waves
  - ionising radiations
- Nuclear reactions and scattering/
  - chemical effects
- Photochemistry.
- Radiochemistry

19.40 PHYSICAL METHODS OF CHEMICAL ANALYSIS

- Chemical analysis/
  - adsorption
  - by mass spectrometry
  - by nuclear reactions
  - electrochemical
  - radioactive
  - X-ray
- Chromatography
- Electron-pole analysis
- Probes
- Radioactive tracers
- Spectrochemical analysis
- Tracers

20.00 GEOPHYSICS

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  - age
  - composition
  - electricity
  - heat
  - rotation
- Geodesy
- Geophysical prospecting
- Geophysics
- Glaciers
- Gravity
- Minerals
- Oceanography
- Radioactive dating
- Radioactivity
- Seawater
- Seismic waves
- Seismology
- Soil

20.10 ATMOSPHERE

- Anemometers
- Atmosphere/
  - composition
  - humidity
  - movements
  - precipitation
  - radioactivity
  - structure
  - temperature
  - thermodynamics
- Atmospheric acoustics
- Atmospheric electricity
- Atmospheric optics
- Atmospheric pressure and density
- Atmospheric spectra
- Atmospherics
- Clouds
- Condensation
- Electromagnetic wave propagation/
  - atmosphere
- Evaporation
- Fallout
- Fog
- Humidity
- Hygrometers
- Ice
- Lightning
- Meteorological instruments
- Meteorology
- Rain
- Rockets
- Satellites, artificial
- Sky brightness
- Snow
- Sunlight
- Thunderstorms
- Twilight
- Wind

20.20 UPPER ATMOSPHERE

- Airglow
- Atmosphere/
  - composition
  - movements
  - radiation belts
  - radioactivity
  - structure
  - temperature
  - thermodynamics
  - upper
- Atmospheric electricity
- Atmospheric optics
- Atmospheric pressure and density
- Atmospheric spectra
- Atmospherics
- Aurora
- Fallout
- Ionisation, atmosphere
- Magnetosphere
- Meteors
- Rockets
- Satellites, artificial
- Sky brightness
- Sunlight
- Twilight
- Zodiacal light

20.30 IONOSPHERE

- Atmospherics
- Aurora
- Electromagnetic wave propagation/
  - ionosphere
- Ionisation, atmosphere
- Ionosphere
- Ionosphere measuring apparatus

20.35 D, E and F-regions

- Ionosphere/
  - D-region
  - E-region
  - F-region

20.40 GEOMAGNETISM

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  - magnetic field
  - magnetic field, variations
- Magnetic storms
- Micropulsations
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20.50 SPACE RESEARCH TECHNIQUES

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- Space vehicles/
  - instrumentation

21.00 ASTROPHYSICS

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- Astronomical spectra
- Astronomy and astrophysics
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- Cosmology
- Elements/
  - origin
  - relative abundances
- Gravitation
- Infrared astronomy
- Interstellar matter

21.10 GALAXIES

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- Galaxies/
  - the Galaxy
- H I regions
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- Nebulae
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21.20 STARS

- Gravitational collapse
- Interstellar magnetic field
- Interstellar matter
- Magnetohydrodynamics
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- Novae
- Stars/
  - composition
  - evolution
  - magnetism
  - radiation
  - spectra
  - structure
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- Thermonuclear reactions
- White dwarfs
- Variable stars

21.30 RADIOSOURCES, X-RAY AND GAMMA-RAY SOURCES

- Cosmic radiation, r.f.
- Pulsars
- Quasars
- Radio sources
- X- and gamma-ray astronomy

21.40 SOLAR SYSTEM

- Asteroids
- Comets
- Cosmic rays
- Earth/
  - rotation
- Gravitation
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- Interplanetary matter
- Jupiter
- Mars
- Mercury, planet
- Meteorites
- Meteors
- Moon
- Neptune
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- Planets
- Pluto
- Saturn
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- Uranus
- Venus

21.45 Sun

- Chromosphere
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  - flares
  - magnetism
  - prominences
  - radiation
  - radiation, corpuscular
  - radiation, r.f.
  - spectra
- Sunspots
- Zodiacal light

21.60 ASTRONOMICAL TECHNIQUES

- Astronomical instruments
- Astronomical observations
- Astronomy and astrophysics
- Radioastronomy
- Telescopes/
  - astronomical

22.00 BIOPHYSICS

- Biophysics

22.10 HEALTH AND MEDICAL PHYSICS

- Biological effects of radiations
- Biological technique and instruments
- Blood
- Dosimetry
- Medical science
- Physiology
- Proteins
- Radiation protection
- Radiography
- Zoology

22.20 HEARING AND SPEECH

- Ear
- Hearing
- Noise/
  - acoustic
- Speech

22.30 VISION

- Eye
- Colour vision
- Vision

23.00 LABORATORY AND EXPERIMENTAL TECHNIQUES

- Biological technique and instruments
- Calculating apparatus/
  - analogue apparatus
  - digital computers
  - digital computer programmes
- Chemical technology
- Heat treatment/
  - alloys
- Laboratory apparatus and technique
- Leak detection
- Materials
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- Zone melting and refining

23.10 HIGH AND LOW TEMPERATURE TECHNIQUES

- Cryostats
- High-temperature phenomena and effects
- High-temperature techniques
- Joule-Thomson effect
- Liquefaction, gases
- Low-temperature phenomena
- Low-temperature production
- Low-temperature technique
- Magnetic cooling
- Refractories

23.20 HIGH PRESSURE TECHNIQUES

- Getters
- High-pressure phenomena and effects
- High-pressure techniques

23.30 VACUUM TECHNIQUES

- Leak detection
- Manometers
- Seals
- Sputtering
- Vacuum apparatus
- Vacuum gauges
- Vacuum pumps
- Vacuum technique

23.40 X-RAY TUBES AND TECHNIQUES

- Dosimetry
- High-voltage techniques
- Radiation monitoring
- Radiation protection
- Radiography
- X-ray absorption
- X-ray diffraction
- X-ray examination of materials
- X-ray measurement
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- X-ray reflection
- X-ray scattering
- X-ray spectra/
  - absorption
  - emission
- X-ray spectrometers
- X-ray spectroscopy
- X-ray tubes
- X-rays/
  - effects

SUBSTANCES

Chemical elements and inorganic compounds

All the chemical elements are listed by name, followed by their compounds, e.g. "Cadmium, Cadmium compounds".

"Hydrogen" is subdivided by the subheadings "neutral atoms", "neutral molecules" and "ions". "Deuterium" and "Tritium" are independent headings. "Hydrogen compounds" is supplemented by "Ice", "Steam" and "Water".

"Oxygen" is supplemented by "Ozone" and "Carbon" is supplemented by "Diamonds" and "Graphite".

The following inorganic compounds are further subdivided by subheadings as shown:-

- Barium compounds/
  - barium titanate*
- Cadmium compounds/
  - cadmium sulphide
- Calcium compounds/
  - calcium fluoride
- Gallium compounds/
  - gallium arsenide†
- Indium compounds/
  - indium antimonide†
- Lithium compounds/
  - lithium fluoride
- Nitrogen compounds/
  - ammonia
  - ammonium compounds
- Potassium compounds/
  - potassium bromide
  - potassium chloride
- Sodium compounds/
  - sodium chloride
- Zinc compounds/
  - zinc sulphide

* Ferroelectric properties are listed under "Ferroelectric materials/barium titanate"

† Semiconducting properties are listed under the corresponding subheadings of "Semiconducting materials"

Organic compounds

Organic compounds are grouped under headings "Organic compounds", "Polymers", "Plastics", "Proteins". "Rochelle salt" is an independent heading.

Co-ordination compounds

Metallic co-ordination compounds are regarded as inorganic with a few exceptions and are indexed under the appropriate metallic compound heading (not under organic compounds), e.g. Ni complex, bis (dimethylglyoximato) nickel (II) under Nickel compounds.

Substance groups

In addition there are the following headings for groups of elements, compounds or substances:-

- Actinides
- Actinide compounds
- Alkali metals
- Alkali-metal compounds/
  - halides
- Alkaline-earth metals
- Alkaline-earth compounds
- Ferrites
- Ferroelectric materials/
  - barium titanate‡
- Garnets
- Halogens
- Inert gases
- Metals
- Minerals
- Rare-earth metals
- Rare-earth compounds
- Semiconductors
- Semiconducting materials/
  - gallium arsenide§
  - germanium§
  - indium antimonide§
  - silicon§
- Superconducting materials/
  - lead‖
  - niobium‖
- Transition metals
- Transition-metal compounds

‡ Used for ferroelectric properties only

§ Used for semiconducting properties only

‖ Used for superconducting properties only

Alloys

General papers on alloys are indexed under "Alloys". Alloys of specified composition are listed under, either

(i) special alloy headings (there are five of them: "Aluminium alloys", "Copper alloys", "Iron alloys", "Nickel alloys", "Steel"), e.g. Al-Ni alloys under "Aluminium alloys" and "Nickel alloys".

(ii) compounds of the named elements, e.g. Mn-Zn alloys under "Manganese compounds" and "Zinc compounds". Silicon-iron under "Iron alloys" and "Silicon compounds".

Special substances and materials

There are also the following special headings for certain common substances:-

- Air
- Blood
- Ceramics
- Clay
- Coal
- Concrete
- Fibres
- Gelatin
- Glass
- Mica
- Optical materials
- Paper
- Porous materials
- Powders
- Quartz
- Rubber
- Ruby
- Sand
- Seawater
- Soil
- Waxes
- Wood

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